REVIEW AND ASSESSMENT
Of Proposed

ZINCTON FARMS LIMITED
Application for License of Occupation
Disposition Transaction 942473
Mountain Resorts Branch, Ministry Forests, Lands and Natural Resource Operations

by
Brian L. Horejsi, PhD
Penticton, British Columbia
November 2021

INDEX

SUMMARY CONCLUSIONS

British Columbia has a legal, as well as a moral and social responsibility to secure grizzly bear populations and supporting habitat; as a citizen, and independent scientist, I call on the Mountain Resorts Branch to show restrain and deny the Zincton application categorically – without conditions. Ideological beliefs that conditions can be "managed" by either Zincton or government – already lacking resources and regulatory capacity – are dangerous and would be irresponsible.

1. Contrary to assertions by Zincton and FLNRO, there is sufficient reason to conclude that grizzly bear population estimates and bear population viability in the Central Selkirks is a critical gray zone of uncertainty.

2. Zincton and its consultants have not only provided no evidence to the contrary; their application is in fact an attempt to exploit this gray zone.

3. Even were we to assume – and I do not make this unsubstantiated assumption – that the bear population were the size and age/sex structure claimed, with the advanced state of environmental impact already existing, this bear population will not maintain it's numbers, movements or distribution if Zincton is approved.

   Critically, it will also loose its already depleted ability to contribute to the regions bear population, and to existing bear viewing opportunities.

4. This region of B.C. has already been predicted – by FLNRO – to experience at least a 17% reduction in the area occupied by grizzly bears in the near future. Zincton will aggravate this loss.

5. Regional bear habitat is already fragmented above the threshold necessary to prevent grizzly bear population and range decline. Zincton will accelerate these declines.

I have not summarized all the observations, evidence or analysis included in this report. I urge Mountain Resorts Branch staff and other decision makers to read the full report.

STATEMENT OF CREDENTIALS : Brian L. Horejsi, PhD.

My name is Brian L. Horejsi. I have a bachelor of science in Forestry from the University of Montana and a PhD in the Behavioral Ecology of large mammals from the University of Calgary. I have been employed as a research biologist and forester in Alberta, the Yukon and the Northwest Territories, and have worked extensively (1976 to present) with grizzly bears and habitat and population conservation efforts in British Columbia (as well as Alberta, Yukon, Montana and Idaho) as a consultant, an independent scientist, and an active citizen.

My grizzly bear field research has included measurement of mortality risk and grizzly bear response to industrial development. Relevant publications and presentations include Horejsi (2019, 2016, 2005, 2004, 2003, 2002a, 2002, 2000, 1999, 1997, 1993, 1986; Horejsi, Gilbert & Craighead (1998); Horejsi & Gilbert (2006). The full citations are included in the Literature Referenced.

GRIZZLY BEARS: FOCUS OF THIS ANALYSIS

In this document I have confined my analysis and observations to the adequacy of the Zincton application, and the subsequent predictable ecological and behavioral impacts of the Zincton development, within the context of the existing regulatory environment, on the Selkirk grizzly bear population and its habitat.

ZINCTON DOCUMENTS LACK SCIENTIFIC / CONSERVATION RIGOR

It is not possible to reconcile the dismissive minimalization toward environmental values and wildlife evident in the Zincton application, including in the environmental overview provided by their consultant, with the rich body of scientific and historical evidence showing that developments of this type have a measurable, and almost entirely negative, impact on individual animals, population viability, and supporting ecosystems. The chasm between the report and documented evidence is alarming, and suggests a breakdown in professional performance and ethics.

This is not uncommon, given the clash in modern society between personal and commercial ambition and economic gain and the broadly recognized overall best interests of the citizens of British Columbia. Degradation of the ecological viability of ecosystems and wildlife populations has always been the basis of human population growth and commercialization of consumption.

What was originally conceived of as the role of government in the form of a socially and scientifically competent regulatory process to stand between these two forces – to protect the former from the latter - has failed to produce ecological and wildlife population viability, as best, but not solely, exemplified by global climate disruption. Other stark examples of failure are growing lists of threatened and endangered species (and populations), never ending battles to maintain connectivity

between landscapes, critical battles over the ecological inadequacy of protected landscapes like Goat Range Park, and persistent efforts to invade ecological landscapes that buffer protected area (like the Zincton development would do to Goat Range Park, for example).

The root cause of all these environmental conflicts, besides human population pressures, is the inadequacy of the regulatory process, like the one this document finds itself in.

Lacking even the basics, such as an evidence based Cumulative Effects Assessment mandate, exposes individuals, involved citizens, and the collective interests of the public, to a haphazard process, like this Mountain Resorts decision; the outcome allows personal and political decision preferences to overwhelm citizens, science, evidence and undermine the ecological integrity of public landscapes.

ZINCTON FAILS TEST OF SCHOLARSHIP AND PUBLIC ACCOUNTABILITY

An examination of the Zincton Application (Zincton 2020) reveals an alarming disconnect between the ideological wishes of the developer and environmental reality. I draw attention to some of these here:

They start early in the document and persist throughout its entirety.

➔ Zincton proposes to contribute 1% of its revenues to a "1% for the planet" program; Contrast this with science based proposals that conservation of existing biological diversity in todays human dominated landscape will require humans to work toward protecting 50% of our landscapes (Wilson 2016). It should be obvious that 1% of the existing economy directed to conservation efforts will be of no consequence.

➔ Zincton claims its' application contains an "extensive environmental review" (page v) when in fact it lacks an Environmental Assessment (EA), a Cumulative effects Assessment (CEA), and is absent an environmental impact assessment (EIA). Granted, the Provincial Environmental Assessment Office exempted them from submitting an EA – "I don't have any concerns or questions (Project Director, Environmental Assessment Office, Government of B.C, in appendix of Zincton) - and Zincton diligently abided by this misdirection, yet chose to claim otherwise. This "free pass" from the EAO is more a testament to the gross inadequacy of the provinces EA process (and office) wherein a project like Zincton, loaded on massive long existing cumulative effects, fails to trigger an environmental assessment .

➔ Zincton employs a diversionary tactic in their application; Great ado is made about Zinctons desires to "clean up" the old Retallack mining site(s), but there

is no direct or indirect connection between this vague promise and the extensive environmental impact the Zincton development will have the on the regional ecosystem. This, and unabashed economic promotion, suggest an effort to divert pubic scrutiny from the environmental consequences of their development by employing the "chase after the grouse with the broken wing" strategy.

➔ Zincton pays lip service to "high value wildlife habitat" - 4047 ha – by casting a toothless Summer wildlife corridor protection zone over the tenure area, all while "allowing" public access, promoting commercial and private mountain biking, and building a lodge and emergency / rest shelters that will promote use throughout the complex of these human made attractions.

The mentality, evident in the Zincton application - that large scale industrial recreation like that proposed by Zincton will "maintain and restore the current north – south wildlife corridors"- exposes the glaring disconnect between the intense commercial propaganda common to the application and the cumulative environmental reality.

➔ Mountain bikers are notorious environmental predators; there does not exist a single known case where mountain bikers have not built illegal trails once they begin use of a first trail; The claims that Zincton can / will control trail proliferation is a "pipe dream" particularly in light of their enabling recognition that bike trails can occur on any slope, and their stated intention that dedicated trails will make us of "pockets" of "possible" bike terrain (p.3-5).

Further, no mention is made of the huge increase in the use of electric bikes, which extend biker impacts by a factor of 20x.

Additionally, no mention is made of the recent appearance of thrillcraft like motorized over-snow mountain bikes which will introduce widespread use of the winter landscape.

Figure is from Missoulian Newspaper, Missoula, MT.

➔ Zinctons plan conflicts with grizzly bear viewing activities on the Whitewater Canyon trail. Yet they continue to propose illogical positions about

protecting grizzly bear viewing while failing to disclose the known impacts industrial scale recreation has on bear behavior and ecology manifested in bear distribution, wariness and overall presence and visibility (McCrory 2021). For an inclusive overview of recreation impacts on wildlife, see Figure below, from Larson et al. 2016)

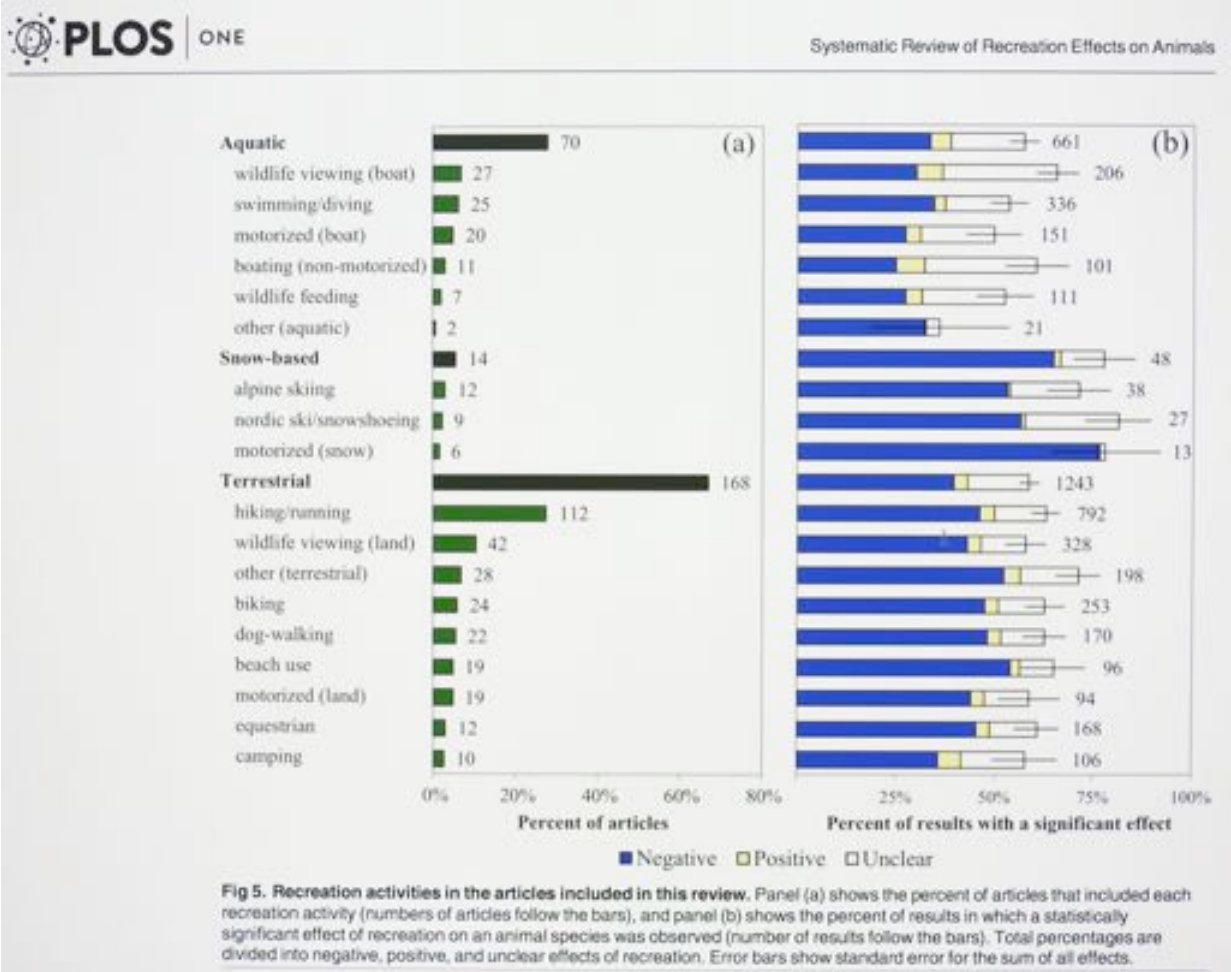

Fig 5. Recreation activities in the articles included in this review. Panel (a) shows the percent of articles that included each recreation activity (numbers of articles follow the bars), and panel (b) shows the percent of results in which a statistically significant effect of recreation on an animal species was observed (number of results follow the bars). Total percentages are divided into negative, positive, and unclear effects of recreation. Error bars show standard error for the sum of all effects.

Figure credit; Larson et al. 2016.

➔ Zincton is apparently willing to off load impacts arising from their development onto the backs of the public – the public will be asked to sacrifice the long standing practice of picking huckleberries – so that Zincton can claim to protect "pregnant bears" (p.1-9).

➔ Zincton reveals an astonishing level of ideological disconnect/distortion in their application; they have a section on Community and Regional context wherein they claim Recreation Reserves will be incompatible with Zinctons ambitions, but they also claim they will work to ensure "pubic recreation value are preserved", all, it seems, while not compromising the areas wildlife and habit values.

Apparently they believe in magic!

In fact, only magic could account for the omission, in their document, of an analysis reconciling this claim and intention.

➔ Zincton makes a practice of mocking their entire premise of "no impact" on wildlife by indicating they will encourage nearby helicopter based recreation users to bunk at Zinctons facilities. Helicopter traffic does not equal "no impact"

RECREATIONAL ACTIVITIES HAVE A MEASURABLE NEGATIVE IMPACT ON GRIZZLY BEARS

Zincton plans to impose over 2000 people into the Central Selkirk grizzly bear population; Their intention is to have this many people occupying their base village, with the majority of those using the proposed tenure area for over snow facilities in winter and for hiking, leisure walking, picnic-ing, outdoor wandering, and mountain biking outside of the winter season. Additionally, were their plans to materialize, several hundred staff would be exploiting the area for work related activities and for recreational relief.

The consequences for bears, and the bear population, are overwhelming. Here I discuss known consequences for bears of this mass intrusion of working and recreating humans.

VERY REAL EVEN IF UNINTENTIONAL

The vast majority of interactions between bears and individual people are unintentional, and once again, in the vast majority of cases people are unaware that they have encountered a bear and elicited a reaction from the bear and caused it to be displaced. For example, even when bears have been deliberately approached for research purposes, "bears were not seen or heard in 84% of the approaches" (Ordiz et al. 2013).

There is a distinction to be made, one with significant meaning, between unintentional and accidental. Mostly this distinction applies to individuals versus organizations or commercial interests. Unintentional does not mean accidental, because planning and enticing people into grizzly bear habitat for commercial purposes, as Zincton is proposing to do, is hardly accidental.

BEARS EXPERIENCE STRESS

Research has revealed that "HRV (heart rate variation) [1] was lowest when the brown bears were closer to human settlements, especially during the berry season, which coincides with the increased human activity in the study area during summer

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[1] Emphasis here is on *variation*, as opposed to overall heart rate.

[2] Literature cited in quotes is not included in the Literature Referenced in this document-.

and fall. Humans occur more often and are more active closer to human settlements, especially when conducting outdoor activities, such as berry picking and hunting, including bear hunting, which occurs in late summer and fall. Given that a decrease in HRV can be interpreted as an indicator of stress, our results suggest that a human-induced "landscape of fear" exists for bears, with human settlements and human activity having a stress effect on these animals." (Stoen et al. 2015).

Animals typically minimize stress by retreating from events or situations that cause them to feel anxiety, discomfort or fear. If they are in the "zone" where they may feel visual, olfactory, auditory or perceived "interaction" and they do not retreat, elevated heart rates caused by increased cortisol production results in increased energy costs.

Research on bears near human activity and settlements, like the Zincton village and lodge for example, show "that approaching human settlements causes additional stress, even if the primary reason is to avoid conspecifics."(Stoen et al. 2015).

BEARS ARE DISPLACED

The following text quotes and three figures are reproduced directly from Mattson 2019. Effects of pedestrians on Grizzly bears, Grizzly bear Recovery Project, Livingston, MT.) [2]

"With the exception of highly tolerant individuals, reactions of grizzly bears to encounters with pedestrians were often evident for 24-72 hours, although sometimes obscured by or confounded with natural variation associated with fine-scale shifts in diets and foraging strategies (Haroldson & Mattson 1985). Most notably, above and beyond initial reactions, movements generally increased, especially for females with COY, as did overall levels of activity—by as much as 1.5-fold (Schleyer et al. 1984, Sahlén et al. 2015). Bears also often reacted by becoming more nocturnal—for as long as 3 days afterward (Ordiz et al. 2013, 2019; Fig. 8). As a corollary, involved bears tended to select for areas with greater cover" .

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[2] Literature cited in quotes is not included in the Literature Referenced in this document-.

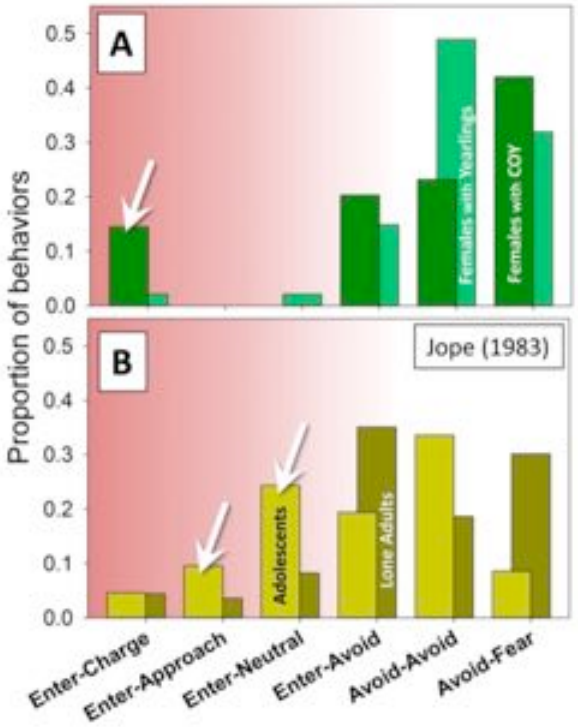

Figure 5. *Reactions of different sex-, age-, and reproductive classes of grizzly bears to pedestrians in Glacier National Park, differentiating (A) females with COY; females with yearlings; (B) adolescents; and lone adult bears.*

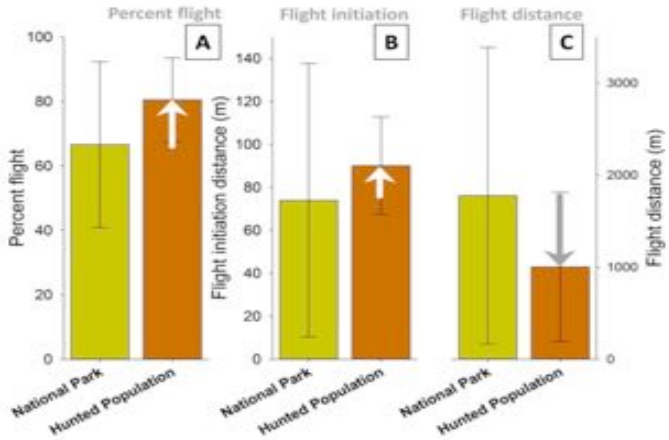

Figure 3. *Summary of reactions by grizzly bears to encounters with people, averaged across all studies for which data are given, including (A) probability of flight, (B) distance at which flight was initiated, and (C) subsequent distance of rapid movement.*

Note that in Matson, above Figure 3, amongst bears that have been subjected to hunting, as is the case in SW B.C. including the area around the proposed Zincton tenure, a greater percent of bears encountered flee, and they

initiate flight at a greater distance from the human than if the area were free of hunting.

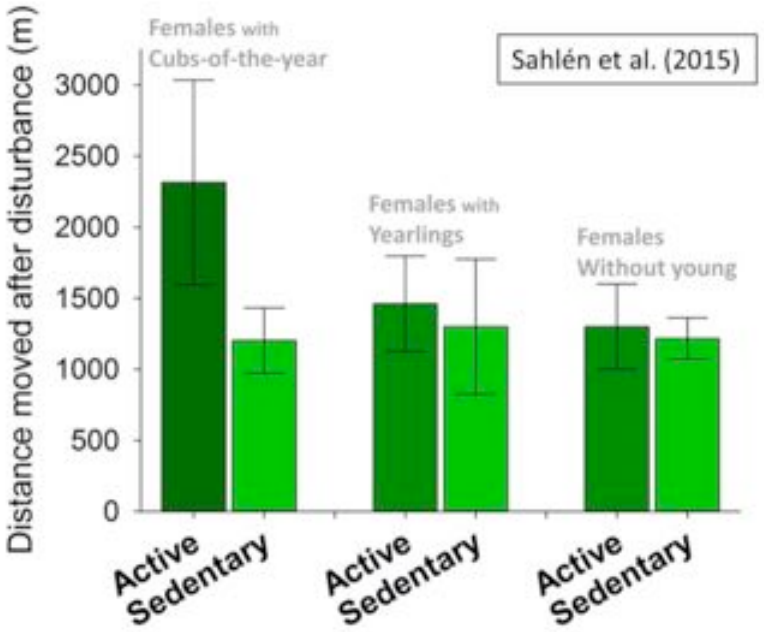

Figure 7. *Effects of reproductive status and level of activity at time of an encounter with pedestrians on subsequent distance moved by adult female bears in Scandinavia.*

Figure Credit: The three figures immediately above have been reproduced from Mattson, D. 2019.

Mattson, above Figure 7, shows female bears with cubs were displaced from their original location by an average of over 2 km if they were disturbed when the bears were active and over one km if the bears had been sedentary at the time of interaction.

BEARS BECOME MORE EVASIVE, FORCING COSTLY ALTERATIONS IN USE OF SPACE AND TIME

An analysis of 76 studies of 62 species from 6 continents revealed that human disturbance resulted in an 36% average increase in nocturnal activity (Gaynor et al. 2018). Large animals, including herbivores like mountain goats, as well as grizzly bears, are at the greatest risk of displacement. These changes have long term impacts, taking place over years, lifetimes and generations. The consequences of this shift to cryptic behavior are one way bears try to accommodate human invasion of their habitat, but the consequences for bears and humans are real.

Lamb (2016) estimated bears subjected to human influence increased nocturnality by 2-3% annually after age 3; he suggested an equivalent increase in

survival. If there were no other human influences this might be viewed as positive but intensifying cumulative human effects, like those in the Selkirk Grizzly Bear Population unit, are likely to nullify this potential advantage.

For humans interested in bear viewing, bears become more difficult to observe, making viewing such as that practiced on the Whitewater Trail on the east side of the proposed Zincton tenure area, less predictable and less successful or efficient.

BEARS WILL BE DISPLACED FROM DENS AND DEN SITES

Grizzly bears are sensitive to disturbance when near or in their den, and that sensitivity is heightened when they are making the initial selection of their den site. Evidence shows bears routinely (but not always) leave their prospective dens site before returning to make the final selection of that site; they may spend as much as two weeks in the area, suggesting they are "testing" the suitability of the site (Sahlen et al. 2013).

This means an extended period of security from human intrusion / disturbance is important. In this study (Sahlen et al. 2013) 22% of the bears initially abandoned the prospective den site presumably because they determined it was not secure.

ZINCTON IS CLAIMING THE IMPOSSIBLE

Zincton claims "no dens have been identified", implying that 1) dens can (easily?) be located, and/or 2) that there must be few dens in the region. In fact, appropriate denning habitat is widespread in the region. There have been thousands of bear denning events in the proposed Zincton tenure area and immediate surrounding area over the past half century; yet few people (outside of researchers using radio collars) come upon or report finding a bear den! Why is that? Bear dens are notoriously difficult to observe, and not by accident; bears deliberately select habitats which offer little line-of-sight visibility and impart a sense of security to the bear (for example, see Sahlen et al. 2013).

CUMULATIVE EFFECTS ANALYSIS ABSENT

A professional, scientifically legitimate CEA would reveal the destructive nature of the Zincton proposal and would point conclusively to its rejection.

The significance of this investigative and regulatory procedure has been recognized in legal proceedings, as in Yahey v. British Columbia, 2021, BCSC 1287. In this case extensive industrial damage to the Blueberry river watershed, all approved by B.C.s regulatory system, was challenged by the Blueberry Indian Band.

The following quotes are directly from BCSC 1287 (2021).

[998] *Taking Nature's Pulse* states at pages 199-200:

> …Even relatively narrow roads through forest can produce marked edge effects that may have negative consequences for the function and diversity of these ecosystems. There is also significant ecosystem degradation in the area beyond the actual feature. The construction of linear features alters hydrology in water courses and increases sedimentation, and can disconnect streams from floodplains and block aquatic species movement.
>
> Roads and other linear features impede the movement of native species, facilitate invasion by alien species and alter predator-prey relationships. Specifically, roads can fragment ranges, populations, habitats and ecosystems, and reduce gene flow, resulting in loss of genetic diversity. Roads can increase access to previously inaccessible areas, resulting in increased road kill of wildlife and increased access for legal and illegal fishing and hunting. Both on-road traffic and off-road vehicles create disturbance, which can alter species behaviour. Roads also facilitate ecosystem conversion, ecosystem degradation, and alien species invasion and environmental contamination.
>
> The ecological impacts of roads can affect approximately 20 times the land area that the roads actually cover. Hence roads and other linear features are a useful index for the cumulative impact on biodiversity…

[1628] It is clear from the above, that the Cumulative Effects Framework and the guidance provided about it did not result in a paradigm shift in the way the Province was taking into account cumulative effects. It was largely business as usual, as applicable legislation and policy remained unchanged.

And;

[1777] In terms of designated areas, as I have noted earlier, the Province has not demonstrated that Ungulate Winter Ranges, Wildlife Habitat Areas, Old Growth Management Areas, Resource Review Areas, or provincial parks are effective tools to protect wildlife in the Blueberry Claim Area.

It should be just as clear to the vast majority of British Columbians that these observations by Justice Burke (BCSC 1287 2021), based on substantial professional evidence, apply to all public lands in B.C.

The far too common absence of cumulative effects analysis in land and wildlife management and conservation decision making, in this case in the Zincton application process, have severely degraded ecosystem across the province and threaten grizzly bears in the Central Selkirk Population Unit.

DEEP & PERSISTENT UNCERTAINTY; BASELINE GRIZZLY BEAR POPULATION ESTIMATES NOT RELIABLE FOR DETERMINING IMPACTS

A fundamental issue in wildlife conservation and development impact assessment is the belief that the target wildlife population, in this case grizzly bears in the Central Selkirk population Unit (PU), is either known (virtually never the case) or has been reliably estimated.

Zincton assumes, while making no reference to provincial government bear population estimates, that the bear population in the region of its applied for tenure, is somehow "known"; further, Zincton, along with the provincial ministry (FLNRO) responsible for protecting / managing grizzly bears and their habitat, imply that the estimated population is somehow "viable" and consequently can tolerate the costs (behavioral and ecological displacement, mortality and subsequent impaired reproduction) imposed upon the population by the industrial recreation scheme Zincton intends to burden them with.

I have had the opportunity to observe and analyze British Columbia's land and wildlife regulatory structure and process for several decades ***(see*** Horejsi in Literature Referenced). This review provides more than sufficient scientific and historical evidence to doubt the above claims and implications made by Zinctons and those made by B.C. government personnel.

Lets examine some of the evidence supporting the skepticism by conservationists, citizens, and independent scientists, that baseline bear population estimates and the government apparatus producing these estimates, is suspect.

BRITISH COLUMBIAS' FAILING LAND / WILDLIFE REGULATORY PROCESS

This section frames the Zincton application, and it subsequent impacts on the regional grizzly bear population and habitat, in the context of the capacity of the provinces statutory, policy and regulatory system to protect wildlife populations, respect and protect the Public Trust, and monitor and police the myriad activities inherent in an all season resort.

On of the most damning assessments of the provinces inadequate, and often faulty, grizzly bear management programs, was provided by the Provinces Auditor General (2017).

The graphics below are taken directly from the Auditors (2017) report.

managing grizzly bear populations throughout B.C. We expected the ministries to have instituted a program that includes a cycle of continuous improvement—the Plan-Do-Check-Adjust cycle (see Audit Approach) and to be reporting out to the public on their performance.

There is no plan to implement the strategic direction for grizzly bears in B.C.

There is a lack of organized inventory and monitoring of grizzly bears in B.C.

In the 1995 Grizzly Bear Conservation Strategy, government made a commitment to increase its research on grizzly bear ecosystems, including a province-wide inventory and assessment of grizzly bears and their habitats. We expected the ministries to have an inventory and monitoring strategy that identifies and prioritises areas based on risk.

COS refers to Conservation Officer Services.

The COS relies on WildSafe BC to deliver an education program to prevent conflict with bears but the program is limited and the COS has not evaluated it for its effectiveness.

Key tools that mitigate industries' impacts on grizzly bear habitat have not been evaluated for their effectiveness.

We found that MoE and MFLNRO have not evaluated the effectiveness of most of their activities

MoE = Ministry of Environment; MFLNRO = Ministry of Forest, lands and Natural Resource Operations.

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Ministries
HAVEN'T FULFILLED
LONG-STANDING
COMMITMENTS
for managing
grizzly bears

Ministry management
of grizzly bears
DID NOT MEET
many of our
EXPECTATIONS

AUDIT OBJECTIVE AND CONCLUSION

AUDIT OBJECTIVE

OUR AUDIT EXAMINED government's management framework for grizzly bears to determine if government is meeting its objective of ensuring healthy grizzly bear populations throughout British Columbia.

AUDIT CONCLUSION

We concluded that government does not have an adequate management framework for grizzly bears. This represents a significant deficiency in government's ability to ensure healthy grizzly bear populations throughout British Columbia.

BASIS FOR CONCLUSION

We found that the Ministry of Environment and the Ministry of Forests, Lands and Natural Resource Operations lack clear accountabilities and do not have an adequate plan in place for grizzly bear management. Nor are the ministries monitoring and evaluating the effectiveness of activities undertaken to mitigate impacts on habitat or conserve habitat.

The Auditors report (2017) includes these additional assessments:

- ➔ "Currently, there is no organized inventory and limited monitoring of grizzly bears."(p.6)
- ➔ "We found that the draft *Assessment Protocol for Grizzly Bear in British Columbia* compiles known information on grizzly bears and their habitat.

> However, there is little direction to decision makers on how to evaluate activities within threatened grizzly bear population units—other than to say that government will develop a process to confirm management direction.
>
> We also found that this protocol neither accounts for uncertainty in the data, nor identifies the need for a precautionary approach in the decision-making process when data is limited." (p. 9)
>
> ➔ "What it doesn't describe, is the level of confidence as to the accuracy of these estimates." (p.10)

and

> ➔ "Overall, there has been limited involvement by government staff and little funding for initiatives to address the lack of connectivity in B.C." (p.54)

In response to the Auditors criticism, the vulnerability, and status, of grizzly bears in B.C. grizzly bear population Units has been estimated by government (Morgan et al. 2020) relying on an international Non Profit organization (Nature Serve, Arlington, VA, USA.) "system" intended to provide an international rating "score" for conservation evaluation. It is almost entirely based on subjective assessments derived from "expert opinion" and lacks, in general, reliance on or use of objective cumulative effects analysis.

The outcome of this subjective process is highly questionable in part because it builds its "case" for the status of a bear population by compiling subjective opinion upon subjective opinion, leading to potential escalating deviation from an evidentiary base and process.

Persistent reliance on subjectivity / opinion (one of the fundamental criticisms of professional reliance as practiced in B.C.) in B.C. bear management is continued in the provinces bear population estimates, where estimates and estimation process (population models) are manipulated based on personal opinion;

> "Expert knowledge of local areas was used to evaluate model estimates and to adjust population estimates for Grizzly Bear Population Units (GBPUs) where the model output did not align with local knowledge" (BC FLNRO 2020).

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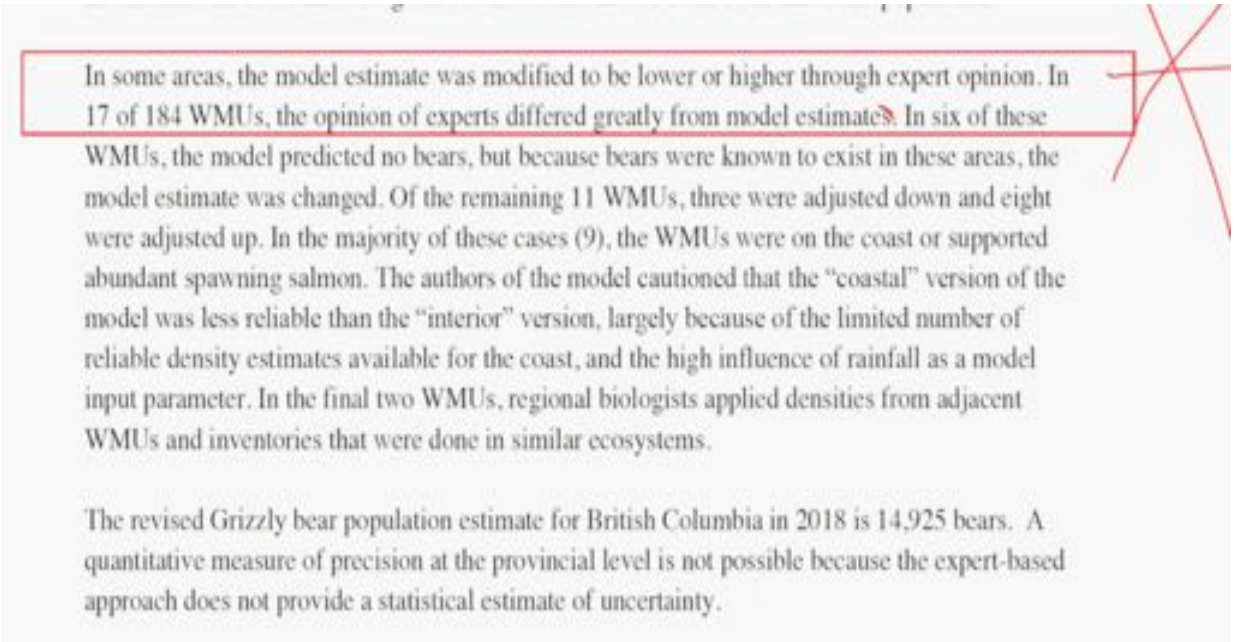


In some areas, the model estimate was modified to be lower or higher through expert opinion. In 17 of 184 WMUs, the opinion of experts differed greatly from model estimates. In six of these WMUs, the model predicted no bears, but because bears were known to exist in these areas, the model estimate was changed. Of the remaining 11 WMUs, three were adjusted down and eight were adjusted up. In the majority of these cases (9), the WMUs were on the coast or supported abundant spawning salmon. The authors of the model cautioned that the "coastal" version of the model was less reliable than the "interior" version, largely because of the limited number of reliable density estimates available for the coast, and the high influence of rainfall as a model input parameter. In the final two WMUs, regional biologists applied densities from adjacent WMUs and inventories that were done in similar ecosystems.

The revised Grizzly bear population estimate for British Columbia in 2018 is 14,925 bears. A quantitative measure of precision at the provincial level is not possible because the expert-based approach does not provide a statistical estimate of uncertainty.

Figure credit; BC FLNRO 2020.

Red flags should be prominent in the eyes of regulators – like The Mountain Resorts Branch of FLNRO – when this subjective process is relied upon to support claims that bear populations are viable and that human intensive and extensive developments like Zincton can be thrust into the Central Selkirk grizzly bear ecosystem.

The team that "rated" threats to grizzly bear populations in B.C.

- dismisses the threat of climate change as "negligible" (their Appendix C), this in contrast with one prediction from the November 2021 COP26 Global Climate Summit in Glasgow, Scotland:
  "negotiators will be faced with the urgent need to get the world economy off the business-as-usual track that will take the Earth up to and beyond 3 degrees Celsius of excess heating before this century's end, according to the Intergovernmental Panel on Climate Change (IPCC)."
- dismisses existing "human intrusion" as low, estimating its impact at less than 1% out of 100,
  in spite of their analysis showing road density (RDen) in the Central Selkirk Population Unit (PU) is .94 km/km^2 and RDen in three adjacent PUs is greater than 1.19 km/km^2. Discussion of the significance of road density follows (page).

My interpretation of this is that adjacent PUs are even worse off than the Central Selkirk and are not functioning as buffers or potential sources of dispersing bears.

- considers the threat of residential development as "low" – a category of threat that would obviously change dramatically with the addition of several thousand people that would be accommodated by the Zincton resort development,

but in spite of these notable mis-judgments, the "team" goes on to rate the over all threats to the bears in the population unit as "medium" or "moderate concern" (M3).

The provincial analysis that produced these Grizzly Bear Population Unit (GBPU) rankings concede that

- "only five units had public empirical trend data"; the Central Selkirk GBPU, in which the Zincton lease is proposed, is not one of them.

It is revealing to contrast B.C.'s "expert" opinion [3], often subjective approach to determining the baseline well-being of grizzly bear populations, with the science / evidence based techniques employed by both U.S. states and federal agencies. Consider the data requirements employed in U.S. grizzly bear population estimates, as evidenced in this statement (Costello et al. 2016);

> "The current population monitoring program, involving capture and radio-telemetry studies to document vital rates, documentation and estimation of annual mortalities, and examination of the distribution of reproductive females and the total population provides data necessary to track changes in population parameters and trajectory."

Value based decision making is a very slippery slope, as opposed to science based decisions, which are "entrenched" at the very top of the public interest, objective scale by evidence and data.

But the reality of todays decision making world is that science and evidence based decision-making depend heavily on public involvement in, support for, and prolonged scrutiny and monitoring of the implementation of science / public interest conservation and management measures. It should go without saying that this interaction – publicly scrutinized processes with evidence / science - is moderated by the degree to which the pubic trusts management (that is government, and Ministry agency / staff) to know and, most importantly, incorporate the evidence into

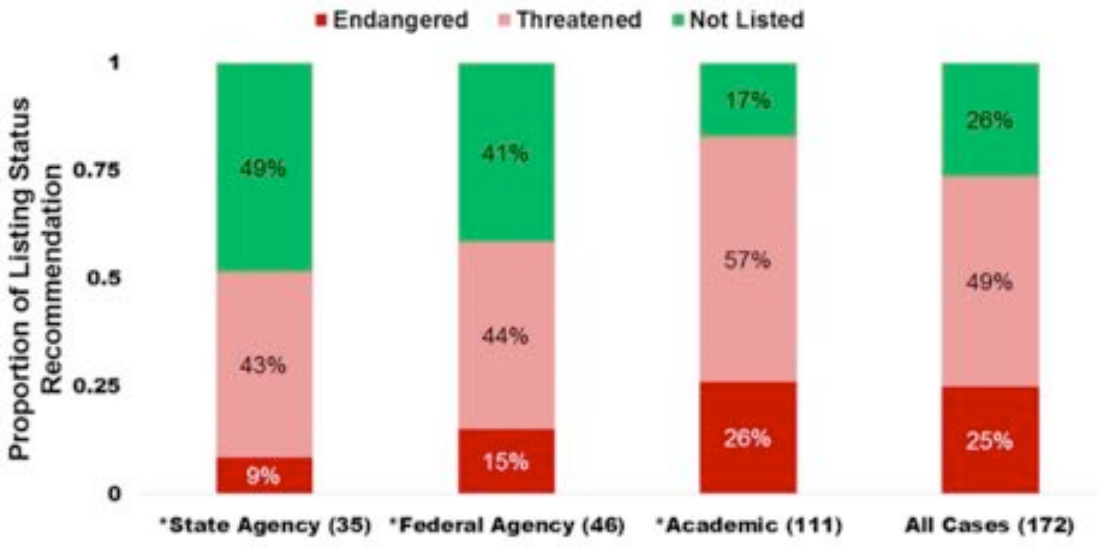
[3] I have put "expert" in quotation marks because few provincial managers or biologists are conversant with grizzly bear biology and ecology, and subsequently, are unlikely (I concede I guesstimate here) to be familiar with the provinces bear population estimating procedure.

decision making (like the Mountain Resort Branch Zincton process) on behalf of the public Trust and overarching public interest.

There is reason to doubt the scientific objectivity of government employees when it comes to decisions that would "hinder" political approval of economic activities.

Consider, for example, these startling revelations by researchers about the capacity of civil servants to shelter their own decisions while favoring limited or lessened environmental regulation and protection of grizzly bears on U.S. public lands. In this instance (Bruskotter et al. 2016) federal and state government employees were 2 to 3 times more likely to remove or recommend removal of (delist) legal protection for grizzly bear populations.

Credit for This figure: Brushkotter et al. 2016.



Researchers' judgments on whether the grizzly bear should be delisted was influenced less by the amount of experience of the individual and more by the person's employer. The Ohio State University, Author provided

As expected, we found considerable evidence of uncertainty in experts' ratings of risk (indicated by variability across experts). But surprisingly, judgments about the conservation status of grizzlies were unrelated to level of expertise. Rather, conservation judgments were strongly associated with the type of organization that employed the experts.

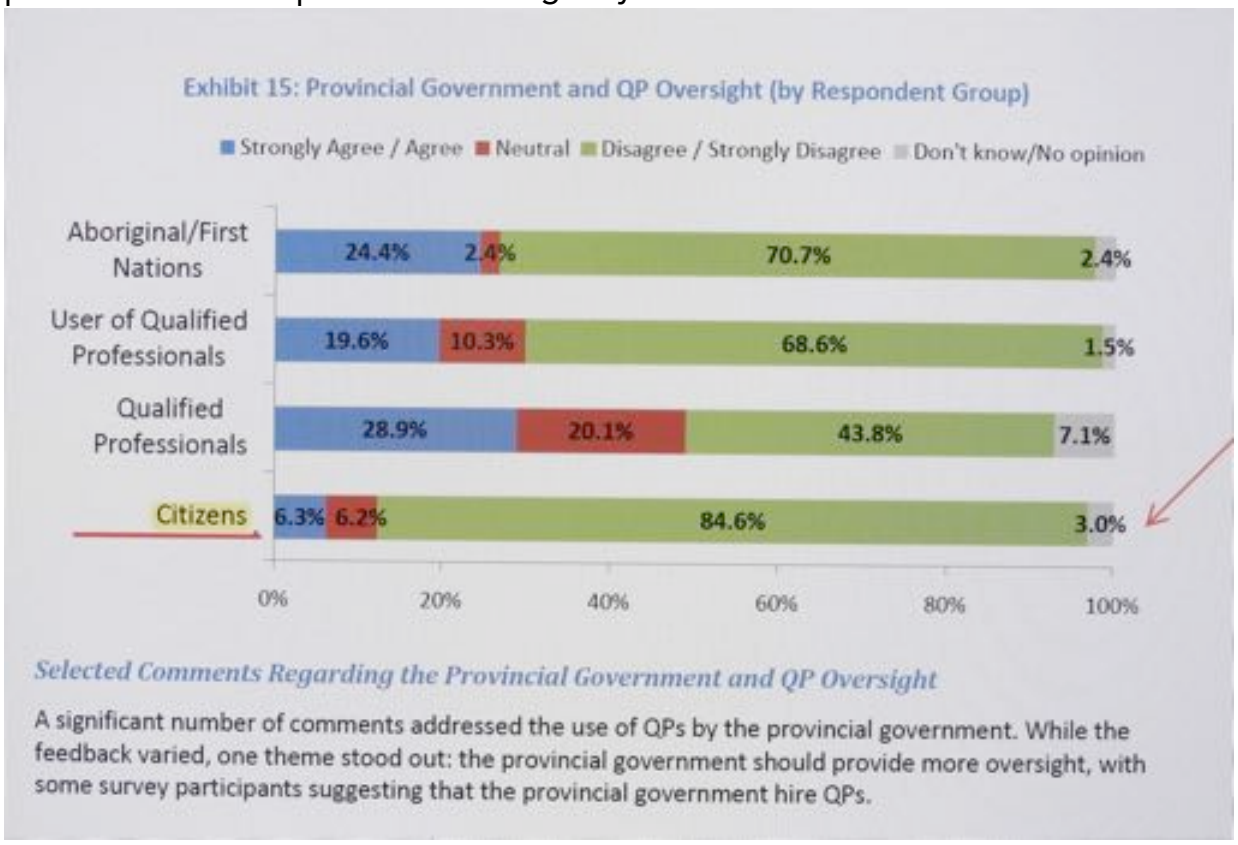
It is important to highlight, by repetition, this conclusion from the figure above; "researchers' judgments" about whether regulatory protection for grizzly bears should be removed "was influenced less by the amount of experience of the individual and more by the persons' employer."

Bruskotter et al. further point out the problematic nature of in-house judgments:

> "Our data suggest that conservation judgments were influenced not so much by an expert's knowledge or assessment of risk but more so by their social environment; in particular, the peers with whom an expert regularly interacts and respects."

The immense social and professional pressure within peer groups (McLeod 2018) - like the civil service and, for example, the recreation or timber industries - to conform overpowers most people, and jeopardizes the public interest. This process seems to be playing out in British Columbia's grizzly bear management practices.

The above findings exposing bias in land and wildlife management decision making are ***not*** entirely news to many British Columbians, the vast majority of whom have expressed disagreement with the provincial governments reliance on "qualified professions" (QP) employed by industry to make land use and conservation decisions; 84% of British Columbians don't trust these people to act in the public interest, preferring instead that legal oversight of QPs be required. Qualified professionals within government – civil servants with expertise related to wildlife and land "management" – also lack oversight, and as revealed above, have a strong predilection to manipulate and skew grizzly bear conservation decisions.



We should expect Zincton to exploit government decision makers regarding the extent to which bear populations are secure or threatened, given that either uncertainly, or dogmatic insistence on reliability, encourages development and regulatory decisions that are in line with their own values.

B.C. land and wildlife managers have made a career out of victimizing wild animals and wildlife populations with the unrelenting authorization of developments that fragment and degrade public lands. They have done so under cover of the umbrella that both government and industry can "manage" participants engaged in, and impacts resulting from, activities government decides to license.

The reality of events on public lands in B.C. (and Google!) however, paint a different picture. The Zincton proposed tenure area is just one of many landscapes where decades of mining, logging, commercial recreation, road building, hunting and trapping have eroded the ecosystems capacity to support wildlife.

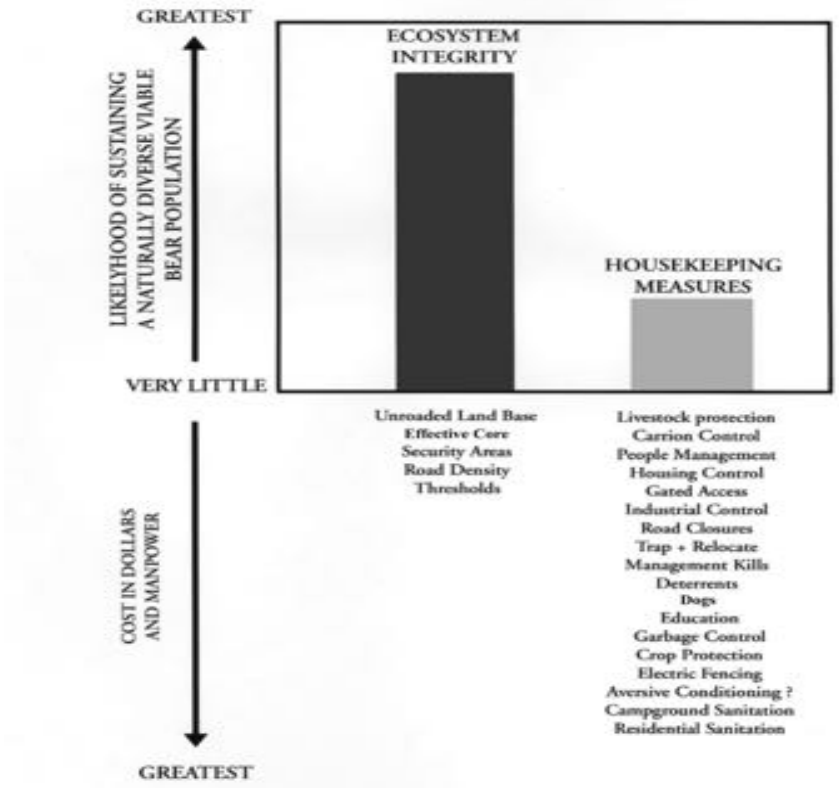


Figure 5. Significance of ecosystem integrity and housekeeping measures in conservation of grizzly bear populations.

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The applied for Zincton tenure area is particularly relevant in the context of the above figure when we consider the critical location this landscape has adjacent to the nearby Goat Range Park. It goes without saying that bears do not recognize human made political boundaries, [4] so movement in and out of Goat Range Park is commonplace.

ZINCTON THREATENS PROTECTED AREAS AND THEIR BEARS

Approval of the Zincton application will jeopardize the formally "protected" ecological integrity of Goat Range Park (and quite likely, at least incrementally, that of Kokanee Provincial, Purcell Wilderness Conservancy and Valhalla Provincial Parks) by impacting grizzly bears that move in and out of the Park.

Bears routinely move 20 – 30 km in only days, and dispersing bears commonly move up to 80+ km while searching for suitable landscapes within which they can establish a home range. Bears also make "excursion" movements to highly attractive sources of food, like the huckleberry patches in the proposed Zincton tenure, movements that are almost surely learned from other bears. And while this would generally be viewed as a "plus" for bears and a bear population, researchers in southeast B.C. showed "that a valley high in both berry resources and human density was more attractive than surrounding areas, and bears occupying this region faced 17% lower apparent survival. Despite lower fitness, we detected a net flow of bears into the… area…, which contributed to a study-wide population decline." (Lamb et al. 2016).

Home ranges of female bears in this part of B.C. are regularly 150 km^2 in size, and male home ranges can be 5x that size! While the Zincton tenure area still contributes to local bear home ranges, albeit at far below 100% effectiveness, expansion of human presence in this landscape will aggravate the "drawing down" of grizzly bear habitat effectiveness throughout local grizzly bear home ranges.

The significance of protected landscapes for grizzly bear population viability is evident in the Kettle GBPU (occupied by a provincially listed "threatened" population of bears) where the density of bears in the Granby Protected Area and an adjacent road closure area is 40% greater than in surrounding "managed" landscapes (Lamb 2019). Lamb also concluded that there would be 27% *fewer* grizzly bears in the ~400 km^2 of road closures around Granby park had the roads not been closed.

The Zincton tenure area already poses a greatly elevated risk for bears that do move into the area, either from Goat Range Park or because their home ranges

[4] There is, on the other hand, a wealth of evidence showing bears are repelled by physically defined boundaries imposed on the landscape by humans and their transportation and industrial activities.

surround it. These bears are exposed to what is know as an ecological trap – a landscape that may attract them for social or ecological purposes, but which predisposes them, as a consequence of human activities, to displacement from preferred areas, increased mortality, and eventual alienation from habitat they may have for generations (formerly) used safely.

Even within the confines of relatively protected but human occupied landscapes, like Yellowstone National Park, bears that come within 6 km of human developments have been subjected to mortality 11 X greater than that of bears in the backcountry (Mattson and Knight 1991).

Further to the immense value of protected landscapes, like the Park complexes in and around the Selkirk Grizzly Bear population unit, Lamb (2019) states

> "Evidence …. supports the idea that secure wilderness areas are critical for carnivore coexistence, as carnivore populations in human influenced areas face excessive mortality and are not self-sustaining without immigration."

DISPLACEMENT and DISRUPTION EFFECT of HIGHWAY 31A and the LOCAL ROAD SYSTEM

After 50 years of grizzly bear research, one fact is indisputable; roads constitute a threat to the viability of grizzly bear populations!

Reported road density in the Selkirk Grizzly Bear Population Unit, which encompasses the proposed Zincton tenure area, is .94 km of road/km^2 of land (BC MFLNRO. 2020). This assessment relies on a provincial road data base, and it is unclear how a "road" is defined and what may, or may not, be included.

The Zincton development would include some road construction, including roads for ski run clearing / construction, and possible for the construction of their alpine Lodge. This is not to clear from the application.

BC Timber sales has a number of cut blocks already in the proposed tenure area and several more are in the planning stage; Road density will increase in the tenure area!

A brief look at some scientific evidence linking roads to negative changes in grizzly bear mortality, reproduction, movements, and habitat use, and population viability follows:

LOW TRAFFIC LEVEL SUFFICENT TO DISPLACE BEARS

Traffic levels on the main road associated with the Zincton proposal, Highway 31a, have been measured at about 800 vehicles daily (as of 2000). [5] This is sufficient to present a barrier to crossing by some bears at certain times of the day.

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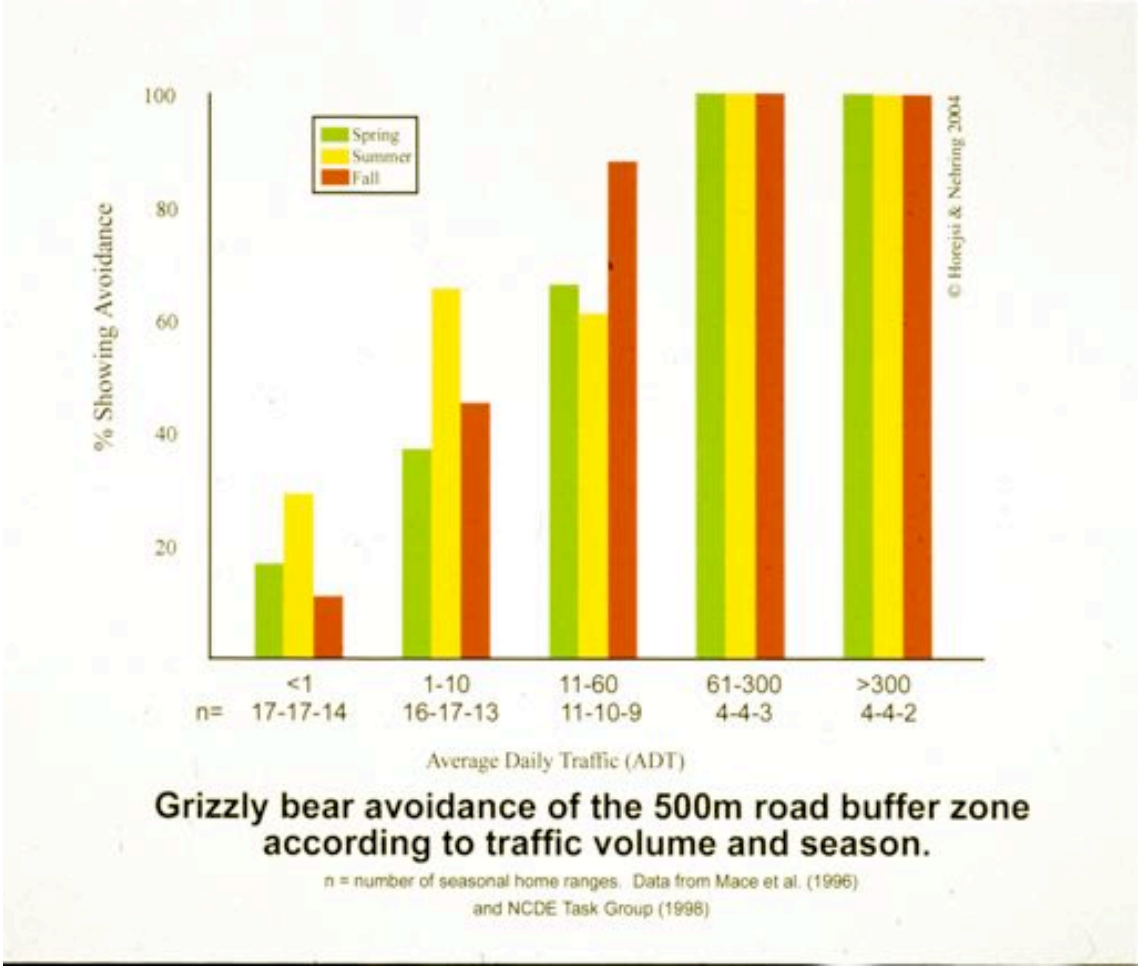
[5] Traffic counters were not in the Zincton area of this road and may overestimate through travel on this road.

If Zincton were to be developed, and their seemingly optimistic visitation projections proved correct, traffic level on this highway would increase, further limiting bear crossing and elevating risk of vehicle collision and bear mortality.

But it is not only road crossing that is impacted by traffic levels. Mace et al. 1996 have shown that bears whose home ranges include roads are displaced from that part of their home range within 500m of a road by relatively low traffic levels. In the figure below, they present the number of seasonal home ranges during which bears show road avoidance based on the Average daily traffic frequency; 40 to 60% of bears avoided the 500 m buffer near the highway when traffic was as low as one to 10 vehicles per day. All bears avoided the 500 meter zone of influence to some degree when average daily traffic exceeded 60 vehicles.

This effect only compounds the expected impact of the proposed Zincton development, and should be considered as an additional threat were the Zincton development road system to be built. When complicated by truck traffic associated with logging in the proposed Zincton tenure area, where vehicle frequency easily exceeds 10 vehicles per day during active logging, the escalating impacts on grizzly bears are easily envisioned.

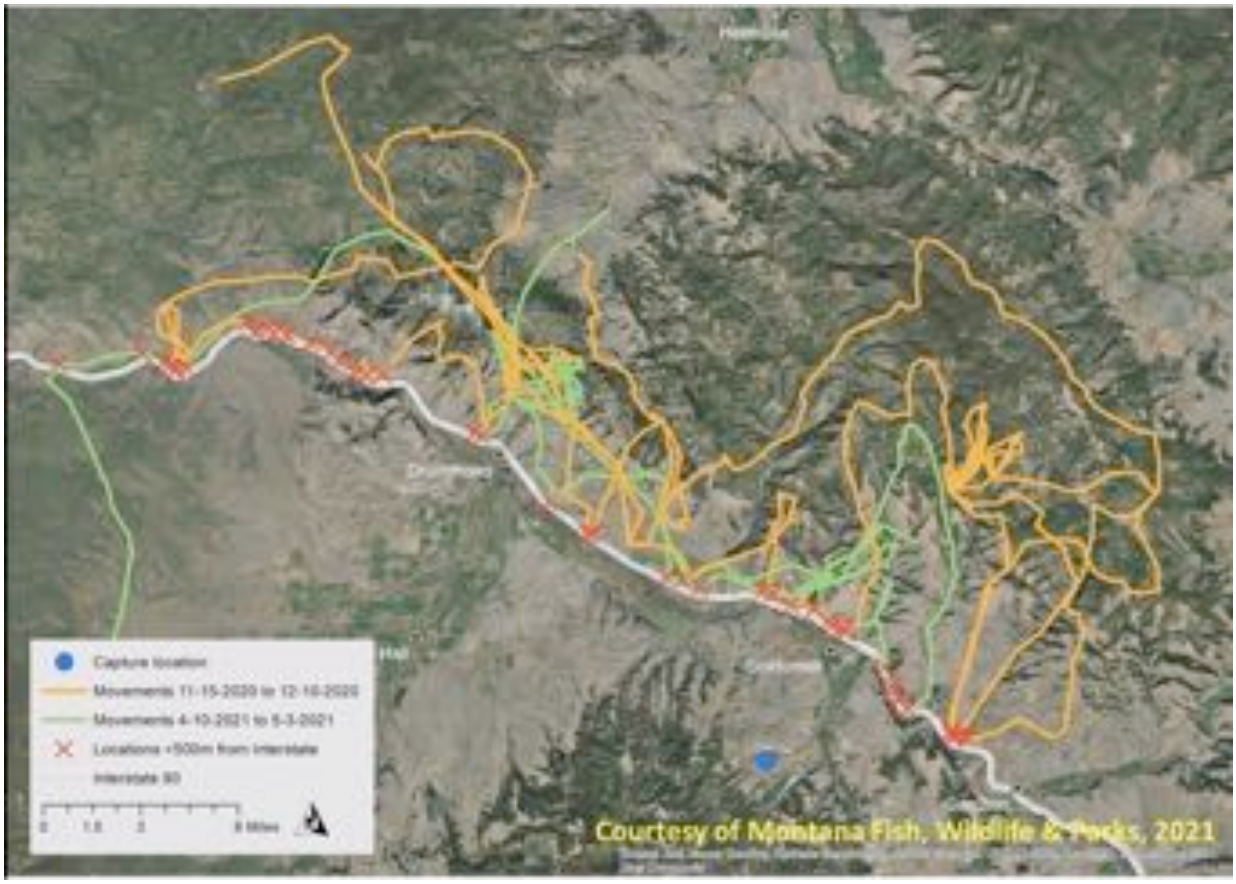


Grizzly bear avoidance of the 500m road buffer zone according to traffic volume and season.

n = number of seasonal home ranges. Data from Mace et al. (1996) and NCDE Task Group (1998)

BARRIER EFFECT OF ROADS AND TRAFFIC

The figure below depicts the movements of a "young" grizzly bear (age not precisely known to this author) as it attempts to cross a two lane highway in Montana. Movements of this bear show just how effective a high traffic highway is at limiting free movement of a bear; this kind of effect is ecologically and behaviorally significant and demonstrates also that a near complete barrier effect is entirely possible.



The two figures immediately above should demonstrate clearly to citizens and bear managers 1) the dramatic curtailment of road crossing events by bears attempting to occupy / establish a home range and 2) the displacement and alienation of bears from habitat resulting from reduced security associated with roads even when bears occupy established home ranges.

ROAD DENSITY THRESHOLD

Research has long ago determined that road densities above .6 km of road per km^2 of land lead to declining grizzly bear populations. As far back as 1993 Mattson concluded road density of .4 km/km^2 was the highest road density compatible with long term bear residency. More recently, evidence indicates a road density of .6 km $road/km^2$ is a functional threshold beyond which managers can expect bear population consequences; Lamb (2016) "found grizzly bear densities to be much higher in areas below the 0.6 threshold, even after controlling for habitat quality". Lamb, after examining grizzly bear population and habitat relationships in southern British Columbia, further concluded

> "that grizzly bear density is reduced across much of the Province due to high road densities, except in Parks and in the remote northern and coastal regions where habitat is more secure."

COMPOUNDING IMPACTS

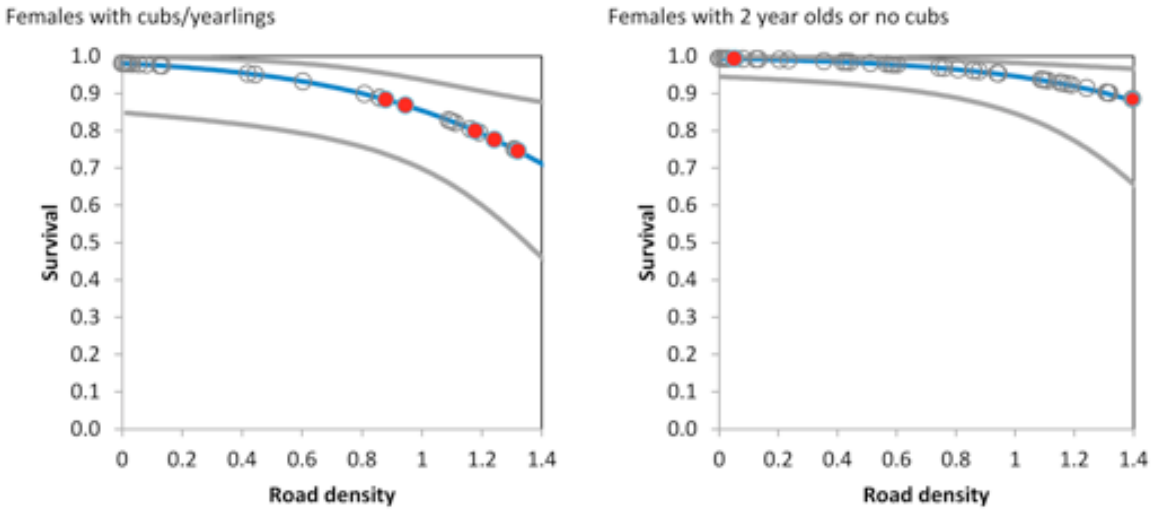
Analysis of grizzly bear population viability in Alberta (Boulanger and Stenhouse (2014)

"demonstrates that road density affects both the direct demography and trend of bear populations but introduces additional risk into reproduction and recruitment. Previous analyses of bears in Yellowstone National Park and the surrounding area also concluded that human development was the principal factor influencing survival rates of grizzly bears. Based on previous demographic analyses it was suggested that sink habitats would be created if adult female survival rate declined below 0.91. Our analyses suggested that the actual survival rate required for areas to not risk declining populations depends on reproductive state. If lower survival rates of females with dependent offspring is considered then the threshold of road density that bears can tolerate is reduced further" (reference the figure below).

"The sensitivity or results to adult female survival rates and reproductive state follows from other demographic studies that demonstrate the highest sensitivity of population trend to adult female survival rates."

Boulanger and Stenhouse estimate that mortality of females with cubs or yearlings exceeds .91 when road density exceeds > .8 km/km^2.

Credit, figure below: Boulanger and Stenhouse (2014).



Female survival below .91 leads to population decline.

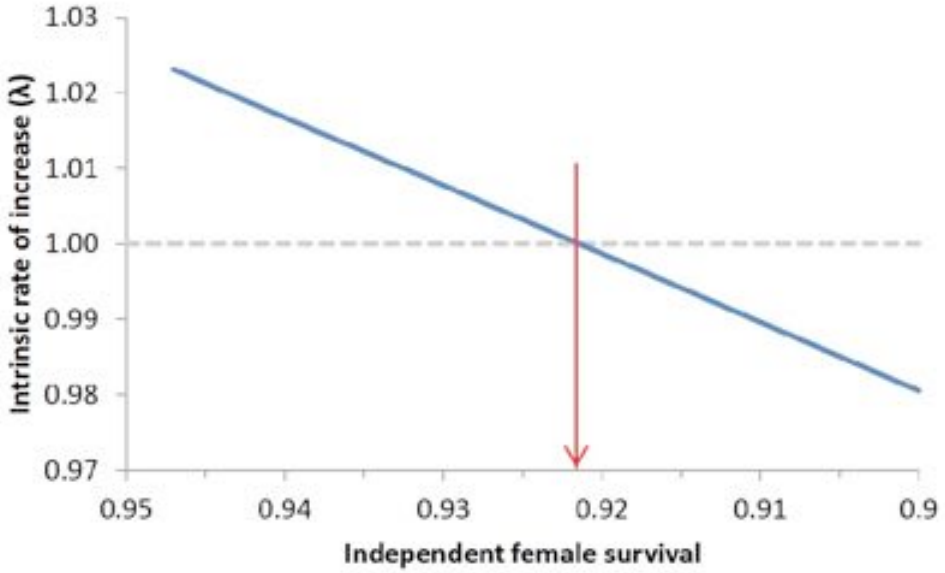


Figure 4.10.1. Relationship between the intrinsic rate of increase (λ) and decreasing rate of independent (≥2 years old) female survival (starting with the observed rate for the NCDE grizzly bear population during 2004–2014). Estimates were derived using standard, dynamic life table analyses utilizing observed rates of female recruitment and dependent female survival during 2004–2014.

Grizzly Bear Demography and Population Management in the NCDE Page 72

Credit this figure: Costello et al. 2016.

British Columbia governments have, metaphorically speaking, a long history of squandering "our" ecological capital without knowing "our" bank balance. The

cases are numerous, not the least being the disappearance of mountain caribou from significant parts of the province, and no one can overlook the constant squabbling and indecision regarding unreliable inventory of old growth forest stands.

The rapid expansion of recreational development tenures, like that proposed by Zincton, is only another example in a long list of proposed and existing developments which continue to be imposed on public land ecosystems at great cost to those ecosystems, the grizzly bears they shelter, and the citizens of British Columbia.

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